Salvage Procedures after Restorative Proctocolectomy: A Systematic Review and Meta-Analysis

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Restorative proctocolectomy with ileal pouch–anal anastomosis (IPAA) construction for ulcerative colitis (UC) or familial adenomatous polyposis can be plagued by a multitude of complications. These problems can lead to pouch failure or poor function.[1-12] The initial misdiagnosis of UC instead of Crohn's disease (CD) can also contribute to IPAA complications.[13] There are several circumstances in which a salvage procedure (SP) is necessary to resolve a complication and to prevent pouch failure. Depending on the complication, a variety of pouch-salvage techniques have been used.[7-12] However, no definitive evidence exists on which treatment strategy is the most appropriate. Surgical treatment can be tailored to suit clinical manifestations and be individualized to optimize outcomes.

The majority of relevant studies have reported on results of SPs performed on select groups of patients at single institutions. Previously published reviews have been mainly narrative, without using analytic statistical methods.[8-12] No systematic review or meta-analysis exists for the outcomes of the SPs, either overall or by category of SP.

The purpose of this systematic review was twofold: first, to systematically record the entire gamut of interventional options, both innovative and conventional, for pouch salvage after IPAA complications; and second, to provide the most current collective estimates of SP outcomes, such as their healing and function success rates.

METHODS

Data sources and search strategy

An electronic search of Medline, Scopus, and Google Scholar was performed from 1978 (first publication on IPAA) to 2013. The MeSH search headings used were "restorative proctocolectomy" and "re-operations." The following text searches, key words, and their combinations were also used: "salvage," "redo," "revision," "complications," "pouch failure," "pouch dysfunction," "pelvic sepsis" "pouch-vaginal fistula," "ileal pouch," "IPAA," and "ileal pouch-anal anastomosis." The related articles function was used to broaden the search. A cross-reference search was also conducted, after full-text articles were selected, and the reference lists of all relevant publications were also manually searched.

Study selection

For all analyses conducted in this review, studies were included only if they reported on the primary outcomes, which were the healing success rates of either SP overall or of SP categories. Studies limited to pouch excisions or re-diversions of IPAA as the only reoperative interventions, or focused on pouch failures and not on outcomes of salvage attempts, were excluded.

Due to the diversity of salvage techniques, the data were considered in the following ways: as overall SPs; as SP subtypes; and as individual SPs. Overall SPs referred to the total number of patients reported in each publication undergoing any type of procedure for pouch salvage. The SPs were classified to the following subtypes: redo SPs, which included abdominal exploration, resection of the existing pouch, and de novo creation of a pouch of any configuration accompanied by an IPAA anastomosis; revisional SPs, which included abdominal exploration and correction of the pouch pathology, including excision or oversewing of fistulas and/or pouch reduction or augmentation, with or without abdomino-anal advancement, and with or without disconnection of the old anastomosis and

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Abbreviations and Acronyms

CD = Crohn's disease
IPAA = ileal pouch-anal anastomosis
OR = odds ratio
PVF = pouch-vaginal fistula
QoL = quality of life
SP = salvage procedure
UC = ulcerative colitis

creation of a new one; and local/perineal SPs, consisting of any procedures that did not require entrance into the abdominal cavity and were completed via the perineal, transanal, transvaginal, or transgluteal route by operative, endoscopic or imaging-guided means. Revisional and local/perineal SPs were further subclassified into individual techniques, for instance, efferent limb excision, abdomino-anal advancement, and dilation of strictures.

Analyses were performed to separately investigate the outcomes of SPs overall, of their subtypes, and of the identified individual techniques. When multiple studies were reported by the same institution, either the most complete and most recent study, or the study that comprised the largest number of patients was included in the overall data retrieval and analysis. Multi-reporting institutions' studies containing pertinent data on isolated techniques, which had not been included in the overall analysis, were maintained for the subtype or the individual technique analyses.

Only series encompassing >10 patients in the respective study cohort were included in the overall review and analysis. All relevant articles, including small case series and case reports, were included in the subtype and individual technique reviews. However, a sensitivity analysis for the primary outcomes was also undertaken, including only mutually exclusive institution series with >50 patients.

Data extraction and outcomes of interest

Relevant data, including first author, institution, year of publication, number of patients undergoing an SP, and pathologic diagnosis, were extracted according to a prespecified protocol. Indications for the SPs were classified as "septic," "mechanical," "inflammatory," "neoplastic transformation," and "not documented." Primary outcomes measures were successful healing rates of SPs overall and of subtype and individual salvage techniques. Secondary outcomes of interest were functional success rates, parameters of pouch functional outcomes (ie, daytime and nighttime number of bowel movements, leakage, nighttime soiling, urgency, use of pads, continence, use of antidiarrheal medications, and dietary restriction), SP morbidity, reoperations after SPs, and failure of SPs (eg, post-SP pouch excision, long-term or permanent diversion, incontinent pouch, and recurrence of pathology). Tertiary outcomes of interest incorporated in the span of this search were patient satisfaction rates and quality of life (QoL) outcomes.

All pertinent information was tabulated in separate data entry forms for the overall and the 3 defined SP subtypes and the index of individual techniques. The methodologic quality of studies was assessed according to the Oxford Centre for Evidence-Based Medicine guidelines for "Levels of Evidence and Grades of Recommendation," with studies assessed as addressing treatment benefits.[14]

Statistical analysis

Relevant study characteristics and outcomes were extracted for each study individually and presented by institution of origin and by reported individual techniques. First, for each variable or result, a summary statistic was calculated from each study to describe the observed intervention effect. Then a summary (pooled) intervention effect estimate was calculated as a weighted average (based on the sample size of each study) of the intervention effects estimated in the individual studies. For outcomes, pooled estimates were calculated with 95% CI. Results were summarized as mean values ± SD for continuous data and percentages (95% CI) for dichotomous data.

For individual studies that provided data for outcomes after separate SP subtypes, meta-analyses were carried out for the dichotomous outcomes variable "healing/nonhealing" using odds ratios (OR) with 95% CI as the summary statistics. The following analyses were undertaken: redo vs revisional, redo vs local/perineal, and revisional vs local/perineal. To combine the OR for the outcomes of interest, the DerSimonian and Laird method for random-effects meta-analysis was used.[15] In the random-effects model, it was assumed that each study had its own true exposure effect and that there was a random distribution of the studies' exposure effects around a central effect. Yates correction was applied for those studies that contained a zero in one cell for the number of events of interest in one of the two groups. Studies were omitted from the meta-analyses of outcomes if there were no events for both groups. In the graphical presentation of the results (Forest plots), squares indicate point estimates of treatment effect (OR), with the size of the square representing the weight attributed to each study, and 95% CI indicated by horizontal bars. The diamond represents the summary ORs from the pooled studies with 95% CI.